

CLAIMS

WHAT IS CLAIMED IS:

1. A refrigeration apparatus which performs a refrigeration cycle by
5 circulating refrigerant through a refrigerant circuit (10), comprising:
an expander (23), disposed in said refrigerant circuit (10), for producing
power by expansion of high-pressure refrigerant;
a first compressor (21), disposed in said refrigerant circuit (10) and
connected to a first electric motor (31) and said expander (23), for compressing
10 refrigerant when driven by power produced in said first electric motor (31) and said
expander (23); and,
a variable capacity second compressor (22), disposed in parallel with said
first compressor (21) in said refrigerant circuit (10) and connected to a second
electric motor (32), for compressing refrigerant when driven by power produced in
15 said second electric motor (32).
2. The refrigeration apparatus of claim 1, further comprising:
control means (50) for regulating the capacity of said second compressor
(22) so that the high pressure of said refrigeration cycle assumes a predetermined
20 target value.
3. The refrigeration apparatus of claim 1, further comprising:
a bypass passage (40) for establishing fluid communication between an
entrance and exit sides of said expander (23) in said refrigerant circuit (10); and,
25 a control valve (41) for regulating the flow rate of refrigerant in said
bypass passage (40).
4. The refrigeration apparatus of claim 3, further comprising:
control means (50) for regulating the capacity of said second compressor

(22) and the valve opening of said control valve (41) so that the high pressure of said refrigeration cycle assumes a predetermined target value.

5. The refrigeration apparatus of claim 4, wherein said refrigeration apparatus
5 is configured so that:

when said control valve (41) is in the fully closed state and the high pressure of said refrigeration cycle falls below said predetermined target value, said control means (50) sets said second compressor (22) in operation and regulates the capacity of said second compressor (22); and,

10 when said second compressor (22) is in the stopped state and the high pressure of said refrigeration cycle exceeds said predetermined target value, said control means (50) places said control valve (41) in the open state and regulates the valve opening of said control valve (41).

15 6. The refrigeration apparatus of claim 1, wherein:

said refrigerant circuit (10) is filled up with carbon dioxide as a refrigerant, and the high pressure of said refrigeration cycle performed by circulating refrigerant through said refrigerant circuit (10) is set higher than the critical pressure of carbon dioxide.

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